Dawson (G. M.) Notes to accompany a Geological Map of the Northern Portion of the Dominion of Canada. 8vo. *Montreal* 1887; On certain Borings in Manitoba and the North-West Territory. 4to. *Montreal* 1887. The Author.

Dawson (Sir J. W.), F.R.S. On the Fossil Plants of the Laramie Formation of Canada. 4to. [*Montreal*] 1886. The Author.

Dubois (A.) Description de Deux Nouvelles Espèces d'Oiseaux. 8vo. [*Bruxelles*] 1887. The Author.

Hughes (F. J.) Supplement to "Harmonies of Tones and Colours developed by Evolution." 4to. *London* 1885. The Author.

Marsh (O. C.) American Jurassic Mammals. 8vo. [*New Haven*] 1887. The Author.

Martone (M.) Sopra un Problema di Analisi Indeterminata. [Two copies.] 8vo. *Catanzaro* 1887. The Author.

May 26, 1887.

Professor G. G. STOKES, D.C.L., President, in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

Professor Archibald Liversidge (elected 1882) was admitted into the Society.

The following Papers were read:—

I. THE BAKERIAN LECTURE.—"On the Dissociation of some Gases by the Electric Discharge." By J. J. THOMSON, M.A., F.R.S., Fellow of Trinity College, and Cavendish Professor of Experimental Physics in the University of Cambridge. Received May 26, 1887.

(Abstract.)

The gases considered are iodine, bromine, chlorine, and nitrogen tetroxide. The effects of the spark on iodine and bromine were investigated in two ways. In the first method the iodine was placed in a tube from which the air had been exhausted, and which was furnished with a gauge which served to measure the changes of pressure in the tube. The liquid in the manometer was sulphuric acid, and in order to avoid any disturbance due to the absorption of

the iodine vapour by this substance, the discharge tube was doubled so that the iodine vapour was symmetrically placed with reference to the sulphuric acid. The system was then placed in an oil-bath and maintained at a temperature which varied in different experiments from about 200° to 230°.

On sparking through such a tube with an induction coil giving a spark about 3 inches long in air, the pressure rapidly increases at first, but the rate of increase gradually diminishes and the pressure finally becomes steady. On stopping the coil by far the greater part of this increase is permanent, or at any rate lasts for several hours. It is not due to the decomposition of the vapour from the sulphuric acid in the gauge, for it does not occur if there is no iodine in the gauge, or if the iodine is replaced by bromine. This increase of pressure can be produced by the silent discharge as well as by ordinary sparking. In order to simplify the conditions as much as possible, I had an arrangement made by which instead of determining the increase of pressure by the sulphuric acid gauge, the vapour density of the iodine after sparking could be measured. In this arrangement the iodine was never near any sulphuric acid.

The result of these determinations is shown in the following table, and it is seen that the results confirm those obtained by the first method.

Unsparked iodine—

Pressure.	Temperature.	(H = 1). Vapour-density.
440	215	137
420	214	130

Sparked iodine—

618	220	110
420	216	115
166	214	84
170	232	86

In the last experiment the vapour-density was determined 24 hours after the sparking.

These figures point to very considerable dissociation of the iodine, in fact the dissociation produced by the spark at 214° is as much as that produced by Victor Meyer at the temperature 1570° C.

The appearance of the dissociated iodine is not greatly different from that of the unsparked, its colour, however, is I think a little lighter and not so uniform. I was not able to detect any change in the absorption spectrum produced by the sparking. The electric strength of the sparked gas was however less than that of the unsparked.

Bromine.

When the experiment with the pressure gauge is made with bromine instead of iodine, it is found that there is a considerable increase of pressure produced by the passage of the spark, but that this disappears almost as soon as the sparking, and on determining the vapour-density of the sparked and unsparked bromine it is found that they are identical. It seems most probable that the difference between bromine and iodine is not that the bromine is not dissociated by the spark, but that the atoms combine very much more quickly than the iodine atoms. The vapour-density determinations showed that bromine vapour is dissociated if it is heated for a long time at a low pressure, even though the temperature is not very high.

The results of these determinations are given in the following table:—

Pressure.	Temperature.	Density.	Remarks.
473	111	80	
466	106	81	
430	101	80	
602	116	79	
543	89	81·7	In bath for 24 hours.
315·5	105	73	
235	109	77	*Sparked.*
230	100	66·5	In bath for 4 hours.
165	90	77	Only a short time in bath.
390	111	70	In bath for 7 hours.

These experiments show that it takes a long time for bromine to reach a state of equilibrium, and that for the experiments on the vapour-density, the gas should be maintained at a constant temperature for some time before the experiments are made.

Experiments on chlorine and nitrogen tetroxide are also described in the paper.

II. "On the Supposed 'New Force' of M. J. Thore."* By William Crookes, F.R.S., Pres.C.S. Received May 5, 1887.

(Abstract.)

The author commences by quoting the description of some apparatus and experiments which have led M. Thore to suspect the existence of a new force inherent in the human organism. M. Thore suspends a

* 'Une Nouvelle Force?' Par J. Thore. Dax, 1887.